Editorial

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Mobile sensing and social computing

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With the rapid development of social networks and social environments, mobile sensing has increasingly emerged as one of the most important technologies to develop social computing solutions. Social computing is a general term for an area of computer science that is concerned with the intersection of social behavior and computational systems, providing a programmable combination of contributions from both humans and computers. A key factor for social computing is how social information is collected from the ubiquitous environments and can be widely used to provide social services in mobile environments.

Mobile sensing is increasingly becoming part of everyday life, as smartphones are becoming the central personal computational device in people's lives. Mobile sensing presents several challenges related to wireless sensor networks, machine learning, human–computer interaction, and mobile systems. Sensor-equipped mobile phones can be combined with wireless sensor networks installed in the environment to develop social machines in many sectors of our economy, including business, healthcare, social networks, environmental monitoring, and transportation.

Some research efforts on social computing and mobile sensing have been in progress, including mobile sensing algorithms, applications and systems, and methods and techniques to develop virtual societies. This IJDSN Special Issue is an opportunity to bring multi-disciplinary experts, academics, and practitioners together to exchange their experience in the development and deployment of mobile sensing and social computing systems. This Special Issue brings together researchers and developers from industry and academy to report on the latest scientific and technical advances on the application of mobile sensing and social computing and to showcase the latest systems using these technologies.

Filipe et al. compile and compare technologies and protocols published in the most recent researches, seeking Wireless Body Area Network (WBAN) issues for medical monitoring purposes to select the most useful solutions for this area of networking. The most important features under consideration in our analysis include wireless communication protocols, frequency bands, data bandwidth, transmission distance, encryption, authentication methods, power consumption, and mobility. WBAN supporting healthcare applications are in early development stage, but offer valuable contributions at monitoring, diagnostic, or therapeutic levels. They cover real-time medical information gathering obtained from different sensors with secure data communication and low power consumption. Filipe et al. demonstrate that some characteristics of surveyed protocols are very useful to medical appliances and patients in a WBAN domain.

Marcelino et al. present a solution to overcome barriers between elderlies and their information and communication technology (ICT) usage in order to potentiate all the benefits provided from mobile sensing and social computing. They present a survey on guidelines, standards, and advices regarding usability and accessibility issues when developing solutions for elderly people made having in mind that senior population have singular requirements due to age-related changes and also frequently technological illiteracy. The authors have identified and applied the most important guidelines to their own solution. A prototype was made using responsive design in order to be adaptable to any type of devices.

Zong and Wen propose a new approach to calculate the smartphone orientation by detecting the vehicle starting action and then establish the coordinate system relationship between vehicle and smartphone. Furthermore, they trained the classified model offline to match the acceleration characteristics with traveling speed. In the model training process we compared different classification algorithms. Due to enclosed areas and intensive energy consumption, GPS or WiFi sometime are invalid. In this paper, Zong and Wen propose a new approach to estimate the traveling speed after analyzing the acceleration characteristics in time domain and frequency domain.

Shuyun et al. propose a method used to calculate the link importance degree index, and the index is used to evaluate the link's information. Besides, a multi-objective optimization model is proposed, its aim is to minimize the total cruise time under detecting as many important links as possible and minimize the information value undetected by unmanned aerial vehicles (UAVs), and the fuzzy operator is introduced to the constraint conditions. Finally, a case study is used to

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demonstrate the feasibility and effectiveness of proposed model about UAVs' route planning. The authors focus on transportation management centers and how to establish a network of fixed and mobile sensors to collect traffic information of highway network, especially for very important links with frequent traffic events.

Wang et al. target that the problem of user–item matrix is a major obstacle to improve the accuracy of the traditional collaborative filtering systems, and meanwhile, it is also responsible for cold start problem in the collaborative filtering approaches. They propose a three-tier network Architecture, which includes user relationship network, item similarity network, and user–item relationship network, constructed using comprehensive data among the user–item matrix and the social networks. Based on this framework, a Regression Model Recommendation Approach (RMRA) is established to calculate the correlation score between the test user and test item. The correlation score is used to predict the test user preference for the test item. The RMRA mines the potential information among both social networks and user–item matrix to improve the recommendation accuracy and ease the cold start problem.

Terroso-Sáenz et al. explore that the combination of mobile and social media sensors is foreseen to become a crucial course of action so as to comprehensively capture and understand the movement of people in large spatial regions. They present a proposal consisting of a personal location predictor that makes use of these two types of sensors. The predictor extracts the mobility models of an area capturing aspects related to particular users along with crowd-based features on the basis of geo-tagged tweets. Unlike previous approaches, the proposed solution mines such models in an online manner so that no previous offline training is required. Then, on the basis of such models, a predictor able to forecast the next activity and position of a user is developed. Finally, the described approach is tested using Twitter datasets from two different cities.

In the last paper, Marcelino et al. discuss about how aging and loneliness have become one of the major issues affecting the quality of life of our senior citizens and how social computing increases social contexts through the use of ICT. They present a social network tailored for the senior population where the feelings of belonging, companionship and connectivity, well-being and interaction, meaningfulness, and emotional comfort are empowered. They focus on a proposal to digitally include all seniors—independent of their educational level, literacy, or technological skills—by promoting a social network that allows them to share their life experiences, strengthen communication, improve their awareness of still playing an active and useful role in society, encourage emotional comfort, improve their health condition, and provide new forms of joyful entertainment in their lives.

Javier Bajo[1], Andrew T Campbell[2], Sigeru Omatu[3], André CPLF Carvalho[4] and Juan M Corchado[5]
[1]Department of Artificial Intelligence, Polytechnic University of Madrid, Madrid, Spain
[2]Dartmouth College, Hanover, NH, USA
[3]Osaka Institute of Technology, Osaka, Japan
[4]University of Sao Paulo, São Paulo, Brazil
[5]Department of Computer and Automation, University of Salamanca, Salamanca, Spain

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